

Appendix E

2015 Percent TDG Instances

Tracking System

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INTRODUCTION

The U.S. Army Corps of Engineers (Corps) tracks the number of instances when the percent TDG exceeds the Oregon (set by Oregon Department of Environmental Quality, ODEQ) and Washington (set by Washington Department of Ecology, WDOE) water quality standards (WQS) as described in Part 1.1.7 of this report. This appendix provides the TDG tracking system results during the 2015 fish passage season from April 1 through August 31. A description of each table follows.

Table E-1 provides a listing of the six TDG instance (Types) that are designated to each instance when the particular state's daily high 12-hour average is exceeded.

Table E-2 designates the specific daily TDG instance type (as defined in Table 1) for all the TDG instances that exceed the applicable WQS of ODEQ and WDOE. These daily TDG instance types are provided by project forebay and tailwater. For the four lower Columbia River projects (e.g. McNary, John Day, The Dalles, and Bonneville) the tailwater TDG instance type is represented for the more restrictive of the two applicable state WQS.

Tables E-3A and E-3B provide the total number of TDG instance types for each project. Table E-3A is the lower Snake River projects and Table E-3B is the lower Columbia River projects.

Table E-4 breaks down the maximum hourly percent TDG value and number of hours of percent TDG instances per project that exceed the state WQS of 125 percent.

Table E-5 provides a historical summary and ten-year average from 2006 to 2015 of the number of hours that exceeded the 125 percent TDG WQS during the spill season. The total number of hours were higher in 2011 and 2008 due to higher flow years and associated involuntary spill occurring.

Table E-6 provides a list of TDG gauges that malfunctioned during the 2015 spill season, which resulted in TDG instances. Malfunctioning gauge TDG instances are noted as Type 2a instance in Tables E-2, E-3A and E-3B to indicate when a TDG instance occurred and appeared as part of the real-time operational review. Table E-2, E-3 and E-6 are based on raw data and are populated during real-time operations. Tables E-4 and E-5 are based on revised data; therefore, they do not include the malfunctioning gauge data since these tables provide statistical information on hourly TDG levels.

TABLE E-1
TRACKING TYPES OF TDG INSTANCE

Type 1 Condition	TDG levels exceed the TDG standard due to exceeding powerhouse capacity at run-of-river projects resulting in spill above the BiOp fish spill levels. This condition type includes:
	<ul style="list-style-type: none"> • High runoff flows and flood control efforts. • BPA load requirements are lower than actual powerhouse capacity or project is carrying system-wide reserves. • Involuntary spill at Mid-Columbia River dams resulting in high TDG levels entering the lower Columbia River. • Involuntary spill at Snake River dams resulting in high TDG levels entering the lower Columbia River.
Type 1a Condition	Planned and unplanned outages of hydro power equipment including generation unit, intertie line, or powerhouse outages.
Type 2 Instance	TDG exceedances due to the operation or mechanical failure of non-generating equipment. This instance type includes:
	<ul style="list-style-type: none"> • Flow deflectors unable to function for TDG abatement with tailwater elevations above 19 - 26 feet at Bonneville Dam. • Spill gates stuck in open position or inadvertently left open. • Increased spill in a bulk spill operation to pass debris or other special operations. • Communication errors, such as teletype were transmitted but change was not timely made or misinterpretation of intent of teletype by Project operator.
Type 2a Instance	Malfunctioning FMS gauge, resulting in fewer TDG or temperature measurements when setting TDG spill caps.
Type 3 Instance	TDG exceedances due to uncertainties when using best professional judgment, SYSTDG model and forecasts. This instance type includes:
	<ul style="list-style-type: none"> • Uncertainties when using best professional judgment to apply the spill guidance criteria, e.g., travel time, degassing, and spill patterns. • Uncertainties when using the SYSTDG model to predict the effects of various hydro system operations, temperature, degassing, and travel time. • Uncertainties when using forecasts for flows, temperature and wind. • Unanticipated sharp rise in water temperature (a 1.5 degree F or greater change in a day). • Bulk spill pattern being used which generated more TDG than expected.
Type 3a Instance	TDG instances due to balancing TDG production with spill for fish passage to meet juvenile dam passage survival performance standards at Lower Monumental Dam.

TABLE E-2
DAILY TDG INSTANCES BY TYPE AT EACH PROJECT, APRIL 2015
ODEQ / WDOE COMBINED METHODS

DATE	Lower Granite Forebay	Lower Granite Tailwater	Little Goose Forebay	Little Goose Tailwater	Lower Monum. Forebay	Lower Monum. Tailwater	Ice Harbor Forebay	Ice Harbor Tailwater	McNary Forebay	McNary Tailwater	John Day Forebay	John Day Tailwater	The Dalles Forebay	The Dalles Tailwater	Bonn Forebay	Bonneville Tailwater	
Method:	WA	WA	WA	WA	WA	WA	WA	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA
04/01/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/02/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/03/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/04/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/05/15	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---	---
04/06/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/07/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/08/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/09/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/10/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/11/15	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---
04/12/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/13/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/14/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/15/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/16/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/17/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/18/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---
04/19/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---
04/20/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	3	---
04/21/15	---	---	3	---	---	---	3a	---	---	---	---	---	---	---	---	3	---
04/22/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---
04/23/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---
04/24/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---
04/25/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---
04/26/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04/27/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	---
04/28/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	---
04/29/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	---
04/30/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	---
Totals	0	0	1	0	0	1	13	0	0	0	0	4	0	0	0	2	0
APRIL GRAND TOTAL = 21																	

* Asterisk would indicate there was an instance, but it was less restrictive than the other states method, therefore it was not counted.

TABLE E-2
DAILY TDG INSTANCES BY TYPE AT EACH PROJECT, MAY 2015
ODEQ / WDOE COMBINED METHODS

DATE	Lower Granite Forebay	Lower Granite Tailwater	Little Goose Forebay	Little Goose Tailwater	Lower Monum. Forebay	Lower Monum. Tailwater	Ice Harbor Forebay	Ice Harbor Tailwater	McNary Forebay	McNary Tailwater	John Day Forebay	John Day Tailwater	The Dalles Forebay	The Dalles Tailwater	Bonn Forebay	Bonneville Tailwater				
Method:	WA	WA	WA	WA	WA	WA	WA	WA	WA	OR WA	WA	OR WA	WA	OR WA	WA	OR WA	WA	OR WA		
05/01/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/02/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/03/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/04/15	---	---	---	---	---	---	3a	---	---	2a	---	---	---	---	---	---	---	---		
05/05/15	---	---	---	---	---	---	3a	---	---	2a	---	---	---	---	---	---	---	---		
05/06/15	---	---	---	---	---	---	3a	---	---	2a	---	---	---	---	---	---	---	---		
05/07/15	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---		
05/08/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---		
05/09/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	3	---		
05/10/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	3	---		
05/11/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	---	---		
05/12/15	---	---	---	---	---	---	3a	---	---	---	---	---	2a	---	---	---	---	---		
05/13/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	---	---		
05/14/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
05/15/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
05/16/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---		
05/17/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---		
05/18/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---		
05/19/15	---	---	---	---	---	---	3a	---	---	---	---	2a	---	---	---	---	---	---		
05/20/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/21/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/22/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/23/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/24/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/25/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/26/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/27/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
05/28/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
05/29/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	3	---		
05/30/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
05/31/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---		
Totals	0	0	0	0	0	0	21	0	0	4	0	0	9	1	0	0	0	3	0	0
MAY GRAND TOTAL = 38																				

TABLE E-2
DAILY TDG INSTANCES BY TYPE AT EACH PROJECT, JUNE 2015
ODEQ / WDOE COMBINED METHODS

DATE	Lower Granite Forebay	Lower Granite Tailwater	Little Goose Forebay	Little Goose Tailwater	Lower Monum. Forebay	Lower Monum. Tailwater	Ice Harbor Forebay	Ice Harbor Tailwater	McNary Forebay	McNary Tailwater	John Day Forebay	John Day Tailwater	The Dalles Forebay	The Dalles Tailwater	Bonn Forebay	Bonneville Tailwater				
Method:	WA	WA	WA	WA	WA	WA	WA	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA
06/01/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/02/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/03/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06/04/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06/05/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06/06/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/07/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/08/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/09/15	2a	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/10/15	2a	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/11/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/12/15	---	---	---	---	---	---	3a	---	---	---	---	---	---	---	---	---	---	---	---	---
06/13/15	---	---	---	---	---	---	3a	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/14/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/15/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/16/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/17/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/18/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/19/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/20/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/21/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/22/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/23/15	---	---	---	---	---	2a	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/24/15	2a	---	---	---	---	2a	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/25/15	2a	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/26/15	2a	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/27/15	2a	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/28/15	2a	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/29/15	2a	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
06/30/15	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Totals	9	0	0	0	0	2	10	0	0	0	0	0	17	0	0	0	0	0	0	0
JUNE GRAND TOTAL = 38																				

TABLE E-2
DAILY TDG INSTANCES BY TYPE AT EACH PROJECT, JULY 2015
ODEQ / WDOE COMBINED METHODS

DATE	Lower Granite Forebay	Lower Granite Tailwater	Little Goose Forebay	Little Goose Tailwater	Lower Monum. Forebay	Lower Monum. Tailwater	Ice Harbor Forebay	Ice Harbor Tailwater	McNary Forebay	McNary Tailwater		John Day Forebay	John Day Tailwater		The Dalles Forebay	The Dalles Tailwater		Bonn Forebay	Bonneville Tailwater	
Method:	WA	WA	WA	WA	WA	WA	WA	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA
07/01/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/02/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/03/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/04/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/05/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/06/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/07/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/08/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/09/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/10/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/11/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/12/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/13/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/14/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/15/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/16/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/17/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/18/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/19/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/20/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/21/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/22/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/23/15	---	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/24/15	---	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/25/15	---	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/26/15	---	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/27/15	---	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07/28/15	---	---	---	2a	---	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---
07/29/15	---	---	---	2a	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/30/15	---	---	---	2a	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
07/31/15	---	---	---	2a	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
Totals	0	0	0	9	0	0	0	1	0	0	0	0	15	0	0	0	0	0	0	0
JULY GRAND TOTAL = 25																				

TABLE E-2
DAILY TDG INSTANCES BY TYPE AT EACH PROJECT, AUGUST 2015
ODEQ / WDOE COMBINED METHODS

DATE	Lower Granite Forebay	Lower Granite Tailwater	Little Goose Forebay	Little Goose Tailwater	Lower Monum. Forebay	Lower Monum. Tailwater	Ice Harbor Forebay	Ice Harbor Tailwater	McNary Forebay	McNary Tailwater	John Day Forebay	John Day Tailwater	The Dalles Forebay	The Dalles Tailwater	Bonn Forebay	Bonneville Tailwater				
Method:	WA	WA	WA	WA	WA	WA	WA	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA	WA	OR	WA
08/01/15	---	---	---	2a	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/02/15	---	---	---	2a	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/03/15	---	---	---	2a	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/04/15	---	---	---	2a	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/05/15	---	---	---	2a	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/06/15	---	---	---	2a	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/07/15	---	---	---	2a	---	2a	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/08/15	---	---	---	2a	---	2a	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/09/15	---	---	---	2a	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/10/15	---	---	---	2a	---	---	---	---	---	---	2a	---	2a	---	---	---	---	---	---	---
08/11/15	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---	---	---
08/12/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08/13/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08/14/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08/15/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08/16/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/17/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/18/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/19/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/20/15	---	---	2a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08/21/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
08/22/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/23/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/24/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/25/15	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/26/15	2a	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
08/27/15	2a	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
08/28/15	2a	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/29/15	---	---	---	---	---	---	---	---	---	---	---	---	2a	---	---	---	---	---	---	---
08/30/15	---	---	---	---	---	2a	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
08/31/15	---	---	---	---	---	2a	---	---	---	---	---	2a	---	---	---	---	---	---	---	---
Totals	3	0	0	11	0	4	0	0	0	0	2	0	21	4	0	0	0	0	0	0
AUGUST GRAND TOTAL = 45																				
SEASONAL GRAND TOTAL = 167																				

TABLE E-3A
WDOE METHOD ONLY
LOWER SNAKE RIVER TDG INSTANCE TYPE
BY PROJECT DAILY TOTALS 2015 FISH PASSAGE SEASON

Note: TDG thresholds are 115% Forebay; 120% Tailwater

2015 Snake River TDG Instance Types Totals									
TDG Instance Types	Lower Granite Forebay	Lower Granite Tailwater	Little Goose Forebay	Little Goose Tailwater	Lower Monumental Forebay	Lower Monumental Tailwater	Ice Harbor Forebay	Ice Harbor Tailwater	Totals
1	0	0	0	0	0	0	0	0	0
1a	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
2a	12	0	0	20	0	6	0	1	39
3	0	0	1	0	0	1	1	0	3
3a	0	0	0	0	0	0	43	0	43
Grand Total	12	0	1	20	0	7	44	1	85

TABLE E-3B
ODEQ / WDOE COMBINED METHOD
MID AND LOWER COLUMBIA RIVER TDG INSTANCE TYPE
BY PROJECT DAILY TOTALS 2015 FISH PASSAGE SEASON

Note: TDG thresholds are 115% Forebay; 120% Tailwater

TDG Instance Types	McNary Forebay	McNary Tailwater	John Day Forebay	John Day Tailwater	The Dalles Forebay	The Dalles Tailwater	BON Forebay	BON Tailwater	Totals
1	0	0	0	0	0	0	0	0	0
1a	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
2a	0	6	0	71	0	0	0	0	77
3	0	0	0	0	0	0	5	0	5
3a	0	0	0	0	0	0	0	0	0
Grand Total	0	6	0	71	0	0	5	0	82

TABLE E-4
MAXIMUM HOURLY PERCENT TDG and
NUMBER of HOURS OVER 125% TDG
April 1 to August 31, 2015

Station	Gauge ID	Maximum % TDG	Number of Hours
Lower Granite Forebay	LWG	---	0
Lower Granite Tailwater	LGNW	---	0
Little Goose Forebay	LGSA	---	0
Little Goose Tailwater	LGSW	---	0
Lower Monumental Forebay	LMNA	---	0
Lower Monumental Tailwater	LMNW	129.8	10
Ice Harbor Forebay	IHRA	---	0
Ice Harbor Tailwater	IDSW	---	0
McNary Forebay	MCNA	---	0
McNary Tailwater	MCPW	---	0
John Day Forebay	JDY	---	0
John Day Tailwater	JHAW	---	0
The Dalles Forebay	TDA	---	0
The Dalles Tailwater	TDDO	---	0
Bonneville Forebay	BON	---	0
Bonneville Tailwater	CCIW	---	0
TOTAL HOURS:			10

TABLE E-5
NUMBER of HOURS OVER 125% TDG
2006 - 2015

Year	Number of Hours Greater than 125% TDG
2015	10
2014	11
2013	0
2012	342
2011	2381
2010	555
2009	52
2008	668
2007	0
2006	589
Average	461

TABLE E-6¹
MALFUNCTIONING TDG GAUGE - 2015

Project	Gauge ID	Dates	Number of Days*	Hours with Questionable Data	Reason for Failed Gauge	Effects on % TDG Reading
Lower Granite Forebay	LWG	6/9-6/10	2	1200 - 1400	GPS/DCP transmission error	Missing
Lower Granite Forebay	LWG	6/24-6/30	7	1300 - 1200	Defective sonde	Erroneously high values
Lower Granite Forebay	LWG	8/26-8/28	3	0600 - 1300	Communication cable bad	Missing
Little Goose Tailwater	LGSW	7/23-8/10	19	0600 - 1200	Algae fouled membrane	Erroneously low values
Little Goose Tailwater	LGSW	8/20	1	0700 - 1500	Defective membrane	Erroneously high values
Lower Monumental Tailwater	LMNW	6/23-6/24	2	1000 - 1000	Defective membrane	Erroneously high values
Lower Monumental Tailwater	LMNW	8/7-8/8	2	0200, 1500, 1800-0700	Communication cable bad	Missing
Lower Monumental Tailwater	LMNW	8/30-8/31	2	1600 - 1300	Crayfish in cap	Erroneously low values
Ice Harbor Tailwater	IDSW	7/28	1	0300 - 1300	Defective sonde	Erroneously low values
McNary Tailwater	MCPW	5/4-5/7	4	1200 - 0900	Flow obstructions	Erroneously low values
McNary Tailwater	MCPW	8/10-8/11	2	1400-1700	Defective membrane	Erroneously high values
John Day Tailwater	JHAW	4/27-4/30	4	1600 - 1300	Possible algae fouled membrane	Erroneously low values
John Day Tailwater	JHAW	5/8-5/13	6	0100 - 1300	Possible algae fouled membrane	Erroneously low values
John Day Tailwater	JHAW	5/16-5/19	4	0100 - 1400	Possible algae fouled membrane	Erroneously low values
John Day Tailwater	JHAW	6/13-6/29	17	0300 - 1000	Possible algae fouled membrane	Erroneously low values
John Day Tailwater	JHAW	7/10-7/21	12	0100 - 1100	Possible algae fouled membrane	Erroneously low values
John Day Tailwater	JHAW	7/29-8/10	13	0100 - 1200	Possible algae fouled membrane	Erroneously low values
John Day Tailwater	JHAW	8/16-8/19	4	0100 - 1200	Possible algae fouled membrane	Erroneously low values
John Day Tailwater	JHAW	8/21-8/31	11	1600 - 2300	Possible algae fouled membrane	Erroneously low values
TOTAL DAYS:			116			

¹ Table E-6 provides additional information on instance Type 2a in Tables E-2 and E-3. Tables E-4 and E-5 are based on revised data, rather than raw, and therefore do not include this malfunctioning gauge data. Note: Table E-6 includes only days with either erroneous data that resulted in a percent TDG instance, days when there is missing data or days that had 8 hours, or more of malfunctioning gauge data.